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# Australia 31-GHz Brightness Temperature Exceedance Statistics

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Water vapor radiometer measurements were made at DSS 43 during an 18-month period. Brightness temperatures at 31 GHz were subjected to a statistical analysis which included correction for the effects of occasional water on the radiometer radome. An exceedance plot has been constructed, and the 1 percent exceedance statistic occurs at 120 K. The 5 percent exceedance statistic occurs at 70 K, compared with 75 K in Spain. These values are valid for all of the three-month data groupings that were studied.

#### I. Observations

In [1], models were derived for weather effects on Ka-band performance analysis. To use the models, measurements of noise temperature effects of a measured amount of water vapor are needed. Therefore, the RO6 water vapor radiometer (WVR) was deployed at DSS 43 in Australia for several years prior to early 1986. Beginning in the spring of 1984, RO6 was pointed at an elevation angle of 45 degrees so that line-of-sight data would be less affected by water on the radome cover. Tip curve data were taken for approximately 30 minutes once or twice weekly. All remaining hours were devoted to 45-degree line-of-sight data.

A line-of-sight observation consists of a 15-minute average of sky count data for the 20.7- and 31.4-GHz radiometer channels and a recording of physical temperatures within RO6. Hot load and base load readings were made. Data were recorded on a diskette, which was replaced twice weekly and mailed to JPL. The operation of RO6 was conducted by DSS 43 station personnel.

RO6 data from the 18-month period of July 1984 through December 1985 are the subject of the present article. Data from earlier epochs are subject to uncertain effects due to water remaining on the radome after precipitation, because the WVR was pointed at zenith at these earlier times. As will be explained below, radome water corrections are a crucial part of obtaining exceedance statistics at the high brightness temperature regime, and these corrections are much greater (and are subject to much greater uncertainties) for zenith data than for 45-degree data. See [2] for Spain measurements.

### II. Data Reduction

In order to convert radiometer sky counts to brightness temperature, it is necessary to know the gain of the radiometer channel that is being used. Tip curves enable this measurement of gain to be made when sky conditions are clear. When it is cloudy, tip curve gains are "noisy." Plots of gain versus instrument temperature were made for several data groupings. Figure 1 is a plot of this relationship for both channels, and it

represents data from the 6-month period of July to December 1984. The solid line was determined from data from August 1985. The agreement of the plotted points in Fig. 1 with the lines indicates that the gain-temperature relationships did not change over a 13-month interval.

The gain-temperature relationship represented by the straight line in Fig. 1(b) was used to reduce all 31-GHz data that will be described in this report

Gain 2 = 
$$8.340 - 0.206 (T_{amb} - 40^{\circ}C)$$

where the units for gain are counts/°C.

Figure 2 is a sample output from a computer program that reduces raw data files and calculates sky brightness temperatures. The first three rows correspond to tip curves, and they yielded measurements of the gain and tip curve correlation coefficient (R-squared) for each channel. The column of interest in this figure is labeled " $TB_{\rm zen}$ ." For the line-of-sight data cycles,  $TB_{\rm zen}$  is the zenith-normalized brightness temperature. There is an entry in this column every 15 minutes. The channel 2 entries in this column-pair are "input" for the next data-reducing program.

The next program collects the 31-GHz zenith-normalized brightness temperatures for a user-specified time period and creates a histogram. Figure 3 is a histogram for the entire 18-month period. The left-most four columns are zenith-normalized brightness temperatures. The fifth column is the number of occasions that a measurement has a given brightness temperature value (designated by the first four columns).

Figures 4(a) and (b) are exceedance plots of 3-month groupings of the data in the previous figure. The figure labels use the term wet radome to remind the reader that the plots are based on data that have not been corrected for water that may have been on the RO6 radome when data were taken.

# **III. Radome Water Correction Procedure**

High brightness temperature values can be produced by water drops remaining on the radome after rain or overnight dew. The SCAMS (Scanning Microwave Spectrometer) WVR has been used to investigate radome water effects. SCAMS measures sky brightness temperature at zenith angles that range from 0 (zenith) to ±60 degrees (i.e., a 30-degree elevation angle at opposite azimuths). After rain, the zenith brightness temperatures are affected the most because more water remains at the top of the curved radome than on the sides. Measurements from each of the SCAMS viewing directions can be used to infer zenith brightness temperature, which will be

referred to as  $TB_z$  (for TB zenith-normalized). When the radome is dry and when there are no lumpy clouds, each of these  $TB_z$  values are the same. When different amounts of water are standing on the various parts of the radome, however, there are different  $TB_z$  values. The smallest value corresponds to the driest part of the radome. When the radome has water, the lowest value for  $TB_z$  usually comes from one of the 60-degree zenith angle viewing directions.

It is fortunate for the present investigation that SCAMS was used at DSS 43 in Spain for a 4-month study of 31-GHz brightness temperature statistics. During the course of analysis of these data, some interesting things were discovered about the effect of water on the SCAMS radome. These findings play a crucial role in deriving a radome water-correcting algorithm for the RO6 Australia data. The Spain data are described in [2]. Some of the Spain data that will be presented here are taken from this article.

Figure 5 is a plot of  $TB_z$  that is derived from the zenith, -48-degree, and -60-degree zenith angle measurements made in Spain. The vertical scale is labeled in 10-K increments, and the horizontal scale is labeled in 1-hour increments. The highest trace invariably corresponds to the zenith data, meaning that there is always more water at the top of the radome than on the sides. The three traces are together before high- $TB_z$  events, and they approach each other during a "drying-out" period. Note that during an event there can be disparities as great as 24 K. While it is raining, the traces are "noisy." During the drying-out phase, the traces are smooth but separated. The last event has a drying-out period that lasts 13 hours.

An empirical relationship has been deduced for the amount of  $TB_z$  excess (attributable to radome water) and the measured (uncorrected)  $TB_z$ . This relationship has been derived for the  $\pm 48$ -degree SCAMS data. Figure 6 is a plot of the data that have enabled this relationship to be determined. The curves can be used to derive corrections, which the following example will illustrate. When measured  $TB_z$  is 80 K, 50 percent of the time the required correction is 27 K, 5 percent of the time the correction is 16 K, and another 25 percent of the time the correction is 35 K. This plot could have been used to correct  $\pm 48$ -degree measurements of  $TB_z$  to derive dry-radome-equivalent TB statistics. For SCAMS it was not necessary to use this procedure, since SCAMS measured  $TB_z$  for many angles, and the lowest  $TB_z$  value was adopted as corresponding to "dry."

Table 1 was derived from the plot of Fig. 6. Note that more categories are used for the redistribution of TBs. The following example will illustrate the use of this table. If there are 100 entries in the histogram of observed (uncorrected)  $TB_z$  values at the 100-K level, 10 percent of these entries (i.e.,

10 entries) would be moved to the histogram location 18 K below 100 K (i.e., 100 - 18 = 82 K), 15 percent would be moved to the histogram location 24 K below 100 K, etc.

Before the SCAMS algorithm is used for correcting radome water effects that are present in the RO6 (Australia) data, it is necessary to demonstrate that the two WVRs respond to rain in the same way. That is to say, whenever  $TB_z$  for SCAMS is too large by a certain amount due to radome water, is  $TB_z$  for RO6 too large by the same amount? The answer is yes, and this was established by conducting side-by-side tests with a garden hose simulation of rain.<sup>1</sup>

# IV. Corrected Brightness Temperature Statistics

Figure 7 is a histogram of the "corrected" brightness temperatures. As in Fig. 3, the first four columns are zenith brightness temperatures and the fifth column is the number of entries in the histogram bin-range.

Table 2 outlines exceedance statistics for the observed (uncorrected) and "radome-water-corrected" brightness temperature histograms. Columns 1 and 2 correspond to "zenith" and "30-degree elevation angle" brightness temperatures (excluding the 3-K cosmic background component). Column 3 is an exceedance table for the uncorrected data (in Fig. 3), and column 4 is an exceedance table for the corrected data (in Fig. 7). Columns 5 through 10 correspond to 3-month group-

ings of the uncorrected data. Columns 11 through 16 correspond to 3-month groupings of the corrected data.

Figures 8(a) and (b) are exceedance plots of the uncorrected and corrected TBs (columns 3 and 4 of Table 2). The difference between the plotted line and "A" symbols shows the result of correcting for radome water effects. The difference is "substantial," which accounts for the long explanation presented (in the previous section) of what was involved in correcting measured TBs for the effects of radome water.

Figure 9 shows exceedance plots for the 3-month groupings of corrected TB data. It is noteworthy that the exceedance statistics do not change with season in the 1 percent region.

The Spain exceedance statistics are shown in the next two figures. Figure 10 is for the 4-month observing period March to June 1984. (Remember that all Spain data shown here would correspond to "dry" even though the correcting table described above was not employed in reducing the Spain data.) The several lines correspond to different data-averaging times. The Australia data have an averaging time of 15 minutes per data point, so that is the appropriate time to use in selecting an exceedance trace in this figure. Figure 11 is based on the data in the previous figure, and it reflects an adjustment that was made for the difference in rainfall that occurred during the 4-month observing period and the climatic average for Madrid. This adjustment is described in the Spain exceedance statistic report [2].

Figure 12 is a repeat of Fig. 9, except that the Spain data of the previous figure are plotted for comparison. There is a remarkable similarity in the levels of the exceedance plots from both stations.

## References

- [1] S. D. Slobin, "Models of Weather Effects on Noise Temperature and Attenuation for Ka- and X-Band Telemetry Performance Analysis," TDA Progress Report 42-88, vol. October-December 1986, Jet Propulsion Laboratory, Pasadena, California, pp. 135-140, February 15, 1987.
- [2] B. L. Gary, "Spain 31-GHz Brightness Temperature Exceedance Statistics," TDA Progress Report 42-94, vol. April-June 1988, Jet Propulsion Laboratory, Pasadena, California, August 15, 1988 (this issue).

<sup>&</sup>lt;sup>1</sup>B. L. Gary, "Rain on Radome Effects," internal memorandum, Jet Propulsion Laboratory, Pasadena, California, November 3, 1985.

Table 1. Correction table for radome water effects (corrections to brightness temperature versus uncorrected brightness temperature)

| TD              | Redistribution percentages |    |    |    |     |    |  |  |  |  |  |
|-----------------|----------------------------|----|----|----|-----|----|--|--|--|--|--|
| TB <sub>z</sub> | 10                         | 15 | 25 | 25 | 15  | 10 |  |  |  |  |  |
| 25              | 0                          | 0  | 0  | 0  | . 0 | 0  |  |  |  |  |  |
| 30              | 0                          | 0  | 1  | 3  | 4   | 6  |  |  |  |  |  |
| 40              | 3                          | 6  | 9  | 11 | 13  | 15 |  |  |  |  |  |
| 50              | 7                          | 9  | 13 | 17 | 21  | 23 |  |  |  |  |  |
| 70              | 11                         | 17 | 22 | 26 | 30  | 36 |  |  |  |  |  |
| 100             | 18                         | 24 | 29 | 33 | 38  | 44 |  |  |  |  |  |
| 140             | 24                         | 30 | 35 | 39 | 45  | 51 |  |  |  |  |  |
| 200             | 31                         | 37 | 42 | 46 | 54  | 60 |  |  |  |  |  |
| 220             | 33                         | 39 | 44 | 48 | 56  | 63 |  |  |  |  |  |

Table 2. Exceedance table for 18-months of 31-GHz brightness temperature data at DSS-43

|       |                  | All wet    | All dry |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|------------------|------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TB    | TB <sub>30</sub> | <b>%</b> > | %>      | 4JASW | 4ONDW | 5JFMW | 5AMJW | 5JASW | 5ONDW | 4JASD | 4ONDD | 5JFMD | 5AMJD | 5JASD | 5ONDD |
| 10.0  | 14.0             | 98.8       | 98.8    | 98.2  | 97.6  | 99.9  | 98.7  | 99.9  | 100.0 | 98.2  | 97.6  | 98.6  | 98.6  | 99.0  | 99.2  |
| 11.0  | 15.9             | 96.4       | 96.2    | 93.7  | 94.9  | 99.2  | 96.5  | 98.2  | 98.5  | 93.5  | 94.8  | 96.6  | 96.6  | 97.0  | 97.3  |
| 12.0  | 17.9             | 91.1       | 90.8    | 83.2  | 89.9  | 96.8  | 91.6  | 85.6  | 96.4  | 82.8  | 89.6  | 92.6  | 92.2  | 90.2  | 91.3  |
| 13.0  | 19.9             | 84.2       | 83.5    | 70.8  | 83.3  | 94.1  | 83.2  | 68.3  | 91.6  | 70.0  | 82.8  | 87.4  | 85.7  | 80.5  | 82.5  |
| 14.0  | 21.8             | 76.6       | 75.7    | 60.0  | 75.7  | 90.7  | 75.6  | 51.1  | 84.1  | 58.9  | 75.0  | 81.3  | 79.1  | 70.6  | 73.1  |
| 15.0  | 23.7             | 68.8       | 67.5    | 50.7  | 67.8  | 86.0  | 66.1  | 41.2  | 75.2  | 49.4  | 66.9  | 74.5  | 71.2  | 62.1  | 64.5  |
| 16.0  | 25.7             | 60.2       | 58.6    | 43.1  | 58.7  | 79.3  | 56.4  | 34.8  | 64.8  | 41.6  | 57.5  | 66.0  | 62.2  | 53.8  | 55.7  |
| 17.0  | 27.6             | 52.7       | 50.8    | 37.9  | 50.8  | 73.0  | 47.1  | 30.7  | 54.0  | 36.2  | 49.3  | 58.5  | 53.9  | 46.8  | 47.9  |
| 18.0  | 29.5             | 46.6       | 44.4    | 34.2  | 44.8  | 65.8  | 40.0  | 27.6  | 45.9  | 32.4  | 43.2  | 51.6  | 46.9  | 40.9  | 41.5  |
| 19.0  | 31.4             | 40.8       | 38.4    | 30.6  | 39.2  | 58.2  | 33.8  | 24.8  | 39.1  | 28.7  | 37.3  | 44.8  | 40.3  | 35.3  | 35.7  |
| 20.0  | 33.3             | 35.3       | 32.7    | 27.8  | 34.2  | 49.1  | 29.4  | 23.1  | 33.0  | 25.9  | 32.2  | 37.6  | 34.1  | 30.4  | 30.5  |
| 22.0  | 37.1             | 27.0       | 24.1    | 23.8  | 26.4  | 34.2  | 23.5  | 20.7  | 25.3  | 21.7  | 24.1  | 26.2  | 24.5  | 23.0  | 23.0  |
| 24.0  | 40.8             | 21.7       | 18.0    | 19.9  | 22.0  | 24.1  | 19.7  | 18.7  | 21.2  | 17.3  | 19.0  | 18.3  | 18.0  | 17.6  | 17.7  |
| 26.0  | 44.6             | 18.5       | 15.0    | 17.8  | 19.6  | 17.8  | 17.4  | 17.2  | 18.6  | 15.1  | 16.3  | 14.8  | 14.9  | 14.9  | 15.0  |
| 28.0  | 48.3             | 16.2       | 12.2    | 16.0  | 17.9  | 13.9  | 16.2  | 15.9  | 16.7  | 12.7  | 13.1  | 11.6  | 12.1  | 12.1  | 12.3  |
| 30.0  | 51.9             | 14.7       | 9.9     | 14.9  | 16.5  | 11.5  | 15.2  | 14.9  | 15.3  | 10.8  | 10.4  | 9.0   | 9.7   | 9.8   | 10.0  |
| 32.0  | 55.6             | 13.3       | 8.2     | 13.9  | 15.0  | 9.7   | 14.1  | 13.8  | 14.1  | 9.3   | 8.3   | 7.2   | 7.9   | 8.1   | 8.3   |
| 34.0  | 59.2             | 12.1       | 7.1     | 12.9  | 13.0  | 8.8   | 13.3  | 12.6  | 12.9  | 8.2   | 7.0   | 6.0   | 6.7   | 6.9   | 7.1   |
| 36.0  | 62.7             | 11.2       | 6.2     | 12.0  | 11.9  | 8.0   | 12.6  | 11.5  | 12.1  | 7.3   | 6.0   | 5.2   | 5.8   | 5.9   | 6.2   |
| 38.0  | 66.3             | 10.2       | 5.4     | 11.3  | 10.4  | 7.2   | 11.9  | 10.4  | 11.1  | 6.4   | 5.2   | 4.5   | 5.0   | 5.1   | 5.3   |
| 40.0  | 69.8             | 9.4        | 4.8     | 10.7  | 9.5   | 6.5   | 10.9  | 9.6   | 10.3  | 5.7   | 4.6   | 3.9   | 4.4   | 4.5   | 4.7   |
| 42.0  | 73.3             | 8.6        | 4.2     | 9.9   | 8.6   | 5.7   | 10.1  | 8.9   | 9.5   | 5.0   | 4.0   | 3.4   | 3.8   | 3.9   | 4.1   |
| 44.0  | 76.8             | 7.9        | 3.8     | 9.2   | 7.7   | 5.2   | 9.5   | 8.2   | 9.0   | 4.6   | 3.6   | 3.1   | 3.4   | 3.5   | 3.6   |
| 46.0  | 80.2             | 7.3        | 3.3     | 8.7   | 7.2   | 4.5   | 8.7   | 7.5   | 8.3   | 4.0   | 3.2   | 2.7   | 3.0   | 3.0   | 3.2   |
| 48.0  | 83.6             | 6.8        | 3.0     | 8.1   | 6.7   | 4.1   | 8.0   | 7.0   | 7.7   | 3.6   | 2.9   | 2.5   | 2.8   | 2.8   | 2.9   |
| 50.0  | 87.0             | 6.3        | 2.7     | 7.6   | 6.1   | 3.8   | 7.0   | 6.4   | 7.3   | 3.2   | 2.6   | 2.3   | 2.5   | 2.5   | 2.6   |
| 55.0  | 95.3             | 5.2        | 2.2     | 6.5   | 4.8   | 3.0   | 5.3   | 5.4   | 5.9   | 2.5   | 2.1   | 1.9   | 2.0   | 1.9   | 2.1   |
| 60.0  | 103.4            | 4.2        | 1.8     | 5.2   | 4.1   | 2.4   | 4.5   | 4.2   | 4.7   | 2.0   | 1.7   | 1.6   | 1.6   | 1.6   | 1.7   |
| 65.0  | 111.3            | 3.5        | 1.4     | 4.4   | 3.5   | 2.1   | 3.8   | 3.2   | 3.8   | 1.5   | 1.4   | 1.3   | 1.3   | 1.2   | 1.3   |
| 70.0  | 119.1            | 3.0        | 1.1     | 3.6   | 2.9   | 1.8   | 3.1   | 2.5   | 3.3   | 1.1   | 1.1   | 1.1   | 1.1   | 1.0   | 1.1   |
| 75.0  | 126.6            | 2.5        | 0.9     | 3.0   | 2.4   | 1.7   | 2.5   | 2.1   | 2.8   | 0.9   | 0.9   | 0.9   | 0.9   | 0.9   | 0.9   |
| 80.0  | 134.0            | 2.1        | 0.8     | 2.5   | 2.1   | 1.4   | 2.0   | 1.7   | 2.3   | 0.7   | 0.8   | 0.8   | 0.8   | 0.7   | 0.8   |
| 85.0  | 141.2            | 1.8        | 0.6     | 2.1   | 1.8   | 1.2   | 1.6   | 1.4   | 2.0   | 0.5   | 0.7   | 0.7   | 0.7   | 0.6   | 0.7   |
| 90.0  | 148.3            | 1.5        | 0.5     | 1.7   | 1.5   | 1.2   | 1.2   | 1.2   | 1.7   | 0.4   | 0.6   | 0.6   | 0.6   | 0.5   | 0.6   |
| 95.0  | 155.1            | 1.3        | 0.5     | 1.4   | 1.2   | 1.1   | 1.0   | 0.9   | 1.4   | 0.3   | 0.5   | 0.6   | 0.5   | 0.5   | 0.5   |
| 100.0 | 161.8            | 1.1        | 0.4     | 1.1   | 1.0   | 1.0   | 0.8   | 0.8   | 1.2   | 0.3   | 0.4   | 0.5   | 0.4   | 0.4   | 0.4   |
| 110.0 | 174.5            | 0.8        | 0.3     | 0.7   | 0.8   | 0.8   | 0.5   | 0.6   | 0.8   | 0.1   | 0.3   | 0.4   | 0.3   | 0.3   | 0.3   |
| 120.0 | 186.6            | 0.6        | 0.2     | 0.5   | 0.6   | 0.7   | 0.4   | 0.4   | 0.6   | 0.1   | 0.2   | 0.3   | 0.2   | 0.2   | 0.2   |
| 130.0 | 197.9            | 0.4        | 0.1     | 0.3   | 0.5   | 0.6   | 0.2   | 0.3   | 0.4   | 0.0   | 0.1   | 0.2   | 0.2   | 0.2   | 0.2   |
| 140.0 | 208.5            | 0.3        | 0.1     | 0.2   | 0.3   | 0.5   | 0.1   | 0.2   | 0.4   | 0.0   | 0.1   | 0.1   | 0.1   | 0.1   | 0.2   |
| 150.0 | 218.3            | 0.2        | 0.1     | 0.1   | 0.3   | 0.4   | 0.1   | 0.2   | 0.2   | 0.0   | 0.0   | 0.1   | 0.1   | 0.1   | 0.1   |
| 160.0 | 227.5            | 0.2        | 0.0     | 0.0   | 0.2   | 0.3   | 0.0   | 0.1   | 0.2   | 0.0   | 0.0   | 0.1   | 0.1   | 0.1   | 0.1   |
| 170.0 | 235.8            | 0.1        | 0.0     | 0.0   | 0.1   | 0.3   | 0.0   | 0.1   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 180.0 | 243.5            | 0.1        | 0.0     | 0.0   | 0.1   | 0.2   | 0.0   | 0.0   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 190.0 | 250.4            | 0.1        | 0.0     | 0.0   | 0.0   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 200.0 | 256.6            | 0.0        | 0.0     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

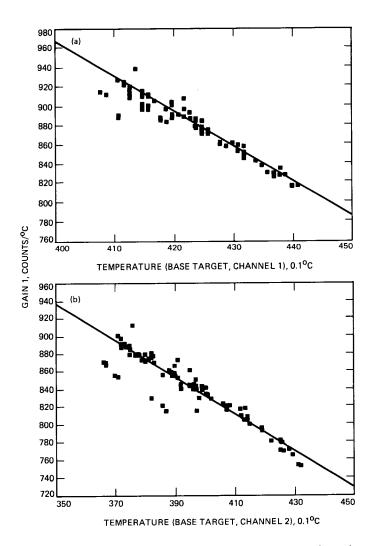


Fig. 1. WVR instrument gain versus mixer temperature from tip curves during a 6-month period in 1984. The straight line is based on data from August 1985.

| GAINS<br>8.35 7.84<br>8.38 7.87<br>8.39 7.88 | 21.9<br>22.8  | 16.4<br>16.7<br>23.2<br>23.2<br>23.7<br>23.6<br>23.8<br>24.2<br>24.4<br>24.2<br>25.2<br>27.2<br>23.5<br>23.0<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3   | R**2.<br>1.00 0.99<br>1.00 1.00<br>1.00 1.00 | 0.67<br>0.63<br>0.53<br>0.25<br>0.25<br>0.25<br>0.27<br>0.27<br>0.29<br>0.47<br>0.23<br>0.23<br>0.30<br>0.47<br>0.23<br>0.23<br>0.38<br>0.38<br>0.38<br>0.38<br>0.38<br>0.30<br>0.47<br>0.23<br>0.23<br>0.23<br>0.23<br>0.23<br>0.24<br>0.25<br>0.29<br>0.29<br>0.29<br>0.29<br>0.29<br>0.30<br>0.30<br>0.30<br>0.47<br>0.29<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30  | 0.62 11<br>0.52 00<br>0.52 00<br>0.29 00<br>0.29 00<br>0.00 00<br>0.06 00<br>0.13 00<br>0.06 00<br>0.13 00<br>0.14 00<br>0.18 00<br>0.11 00<br>0.21 00<br>0.35 00<br>0.35 00<br>0.39 00<br>0.39 00<br>0.39 00<br>0.31 00<br>0.31 00<br>0.31 00<br>0.32 00<br>0.31 00<br>0.3 | 1.47<br>1.554<br>1.45<br>1.550<br>1.554<br>1.57<br>1.64<br>1.71<br>1.65<br>1.99<br>1.99<br>2.03<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19  | -20<br>-11<br>-25<br>-22<br>-24<br>-17<br>-17<br>-41<br>-53<br>-49<br>-41<br>-68<br>-16<br>-24<br>-90<br>137<br>-75<br>175<br>175<br>175<br>175<br>175<br>175<br>175<br>175<br>175<br>1  | 22.5<br>23.2<br>23.5<br>23.3<br>23.3<br>23.3<br>24.4<br>25.6<br>26.1<br>27.7<br>26.9<br>27.6<br>29.8<br>29.8<br>29.8<br>29.8<br>29.8<br>29.8<br>29.8<br>29.8                                       | 15.7   | good.t<br>43.6 8.35<br>43.6 8.38<br>43.5 8.39 |  |
|--|---|--|--|---|--|--|--|--|--|---|--|
| 8.38 7.87                                    | 22.8<br>30.1.15<br>30.3<br>31.7<br>31.3<br>31.3<br>31.3<br>33.6<br>33.6<br>33.6<br>33.6<br>33.7<br>39.0<br>40.2<br>42.0<br>42.0<br>42.0<br>42.0<br>42.0<br>38.0<br>38.0<br>38.0<br>38.0<br>38.0<br>38.0<br>38.0<br>38 | 16.4<br>16.7<br>23.2<br>23.2<br>23.7<br>23.6<br>23.8<br>24.2<br>24.4<br>24.2<br>25.2<br>27.2<br>23.5<br>23.0<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3   | 1.00 1.00                                    | 0.61<br>0.532<br>0.25<br>0.22<br>0.130<br>0.17<br>0.246<br>0.20<br>0.47<br>2.39<br>0.352<br>0.352<br>0.352<br>0.362<br>0.386<br>0.388<br>0.388<br>0.386<br>0.386<br>0.397<br>0.500<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.400<br>0.  | 0.52 00<br>0.47 00<br>0.29 00<br>0.20 00<br>0.20 00<br>0.13 00<br>0.27 00<br>0.08 00<br>0.18 00<br>0.18 00<br>0.19 00<br>0.35 00<br>0.39 00<br>0.39 00<br>0.39 00<br>0.39 00<br>0.39 00<br>0.39 00<br>0.19 00<br>0.1 | 1.55<br>1.54<br>1.554<br>1.550<br>1.554<br>1.554<br>1.554<br>1.64<br>1.72<br>1.65<br>1.81<br>2.13<br>1.92<br>2.03<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19  | -20<br>-11<br>-25<br>-22<br>-24<br>-17<br>-17<br>-41<br>-53<br>-49<br>-41<br>-68<br>-16<br>-24<br>-90<br>137<br>-75<br>175<br>175<br>175<br>175<br>175<br>175<br>175<br>175<br>175<br>1  | 22.8<br>22.5<br>23.2<br>23.3<br>23.3<br>23.3<br>23.3<br>24.4<br>25.0<br>24.4<br>27.6<br>29.8<br>27.6<br>29.8<br>29.8<br>30.4<br>29.8<br>31.2<br>28.5<br>28.5<br>29.8                               | 16.4<br>16.7<br>17.4<br>18.0<br>17.8<br>17.8<br>17.9<br>18.3<br>18.5<br>18.9<br>20.3<br>18.9<br>17.7<br>17.3<br>18.2<br>20.4<br>21.3<br>22.1<br>22.3<br>22.1<br>23.5<br>20.1<br>21.3         | 43.6 8.38                                     | 42.2 7.87 835 76 42.1 7.88 841 76 834 76 834 76 834 76 834 76 834 76 834 76 835 76 835 76 837 76 837 76 838 76 839 76 839 76 839 76 839 76 839 76 839 78 839 78 839 78 839 78 839 78 839 78 839 78 839 78 839 78 839 78 839 78 839 78 839 78 842 79 842 79 842 79 844 79 844 79 844 79 844 79 845 88 |
|  | 30.1<br>31.1<br>31.3<br>31.3<br>31.3<br>31.3<br>32.8<br>33.0<br>35.1<br>37.2<br>37.1<br>40.2<br>42.0<br>42.0<br>42.0<br>42.0<br>42.0<br>38.9<br>38.2<br>38.7<br>38.2  | 23.3<br>23.2<br>23.7<br>23.7<br>23.8<br>24.2<br>24.6<br>25.2<br>27.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24   |  | 0.32<br>0.25<br>0.13<br>0.30<br>0.17<br>0.16<br>0.20<br>0.47<br>2.39<br>0.53<br>0.86<br>0.38<br>0.31<br>0.64<br>0.30<br>0.30<br>0.47<br>2.39<br>0.53<br>0.23<br>0.86<br>0.30<br>0.30<br>0.30<br>0.47<br>0.53<br>0.23<br>0.86<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.47<br>0.53<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64<br>0.64  | 0.29 00<br>0.20 00<br>0.13 00<br>0.06 00<br>0.27 00<br>0.18 00<br>0.18 00<br>0.18 00<br>0.11 00<br>0.21 00<br>0.35 00<br>0.35 00<br>0.39 00<br>0.37 00<br>0.37 00<br>0.47 00<br>0.57 00<br>0.58 00<br>0.5 | 1.45<br>1.55<br>1.55<br>1.55<br>1.57<br>1.64<br>1.71<br>1.65<br>1.99<br>1.99<br>2.03<br>2.01<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.1  | 25<br>92<br>24<br>187<br>17<br>14<br>6<br>3<br>21<br>8<br>4<br>-19<br>-41<br>-53<br>-49<br>-41<br>-68<br>-16<br>24<br>90<br>81<br>177<br>175<br>177<br>179<br>187<br>187<br>187<br>187<br>187<br>187<br>187<br>187<br>187<br>187                   | 22.5<br>23.2<br>23.5<br>23.3<br>23.3<br>23.3<br>24.4<br>25.6<br>26.1<br>27.7<br>26.9<br>27.6<br>29.8<br>29.8<br>29.8<br>29.8<br>29.8<br>29.8<br>29.8<br>29.8                                       | 17.5<br>17.4<br>18.0<br>17.8<br>17.7<br>18.2<br>18.3<br>18.5<br>18.9<br>17.7<br>17.3<br>18.0<br>18.2<br>20.4<br>21.3<br>22.4<br>22.3<br>22.3<br>22.3<br>22.3<br>22.3<br>22.3                 | 43.5 8.39                                     | 834 7: 835 7: 834 7: 834 7: 834 7: 834 7: 835 7: 839 7: 839 7: 835 7: 842 7: 842 7: 842 7: 842 848 867 8 888 8 888 888 888 888 888 888 888 88  |
|  | 31.15<br>30.33<br>31.3<br>31.3<br>31.3<br>32.8<br>33.6<br>33.6<br>33.6<br>33.6<br>33.6<br>33.6<br>33.7<br>31.3<br>32.8<br>33.6<br>33.6<br>33.6<br>33.6<br>33.6<br>33.6<br>33.6<br>33                                  | 23.2<br>23.7<br>23.6<br>23.7<br>23.6<br>23.8<br>24.2<br>24.4<br>24.6<br>25.2<br>27.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24   |  | 0.25<br>0.22<br>0.30<br>0.17<br>0.216<br>0.20<br>0.19<br>0.39<br>0.37<br>0.53<br>0.20<br>0.38<br>0.38<br>0.38<br>0.38<br>0.38<br>0.38<br>0.36<br>0.30<br>0.40<br>0.40<br>0.20<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40 | 0.20 00<br>0.13 00<br>0.06 00<br>0.27 00<br>0.08 00<br>0.18 00<br>0.14 00<br>0.21 00<br>0.35 00<br>0.35 00<br>0.39 00<br>0.39 00<br>0.39 00<br>0.39 00<br>0.37 00<br>0.47 00<br>0.47 00<br>0.47 00<br>0.47 00<br>0.137   | 1.54<br>1.550<br>1.54<br>1.54<br>1.54<br>1.64<br>1.71<br>1.65<br>1.81<br>2.13<br>1.92<br>2.03<br>2.03<br>2.01<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.1   | 9<br>224<br>18<br>17<br>16<br>3<br>1<br>14<br>6<br>3<br>1<br>8<br>4<br>-19<br>-41<br>-53<br>-41<br>-68<br>-16<br>24<br>90<br>137<br>75<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>17                               | 23.2<br>23.5<br>23.3<br>23.3<br>23.4<br>25.0<br>25.0<br>26.1<br>26.9<br>27.6<br>29.8<br>27.6<br>29.8<br>29.8<br>30.4<br>29.8<br>31.2<br>28.5<br>28.5<br>28.5<br>28.5<br>28.5<br>28.5<br>28.5<br>28 | 17.4<br>18.0<br>17.8<br>17.8<br>17.7<br>17.9<br>18.3<br>18.5<br>18.9<br>20.3<br>18.7<br>17.3<br>18.2<br>21.3<br>22.4<br>22.4<br>22.3<br>23.6<br>22.1<br>22.3<br>22.3<br>22.3                 |   | 835 7<br>834 7<br>834 7<br>834 7<br>835 7<br>839 7<br>839 7<br>835 7<br>842 7<br>842 7<br>842 7<br>850 8<br>857 8<br>861 8<br>867 8<br>888 8<br>888 8<br>888 8<br>888 8  |
|  | 31.5<br>30.9<br>31.3<br>31.7<br>32.8<br>33.6<br>33.6<br>35.6<br>37.3<br>37.3<br>37.2<br>37.2<br>37.2<br>39.0<br>42.0<br>42.0<br>42.0<br>42.0<br>38.4<br>42.0<br>38.9<br>38.2<br>38.7<br>38.2                          | 23.9<br>23.7<br>23.8<br>24.4<br>24.2<br>24.6<br>25.3<br>24.3<br>24.0<br>24.3<br>24.0<br>24.3<br>24.9<br>27.3<br>31.5<br>31.7<br>29.6<br>29.0<br>27.3<br>27.3<br>29.0<br>29.0<br>29.0<br>29.0<br>29.0<br>29.0<br>29.0<br>29.0 |  | 0.22<br>0.13<br>0.30<br>0.17<br>0.24<br>0.16<br>0.19<br>0.47<br>0.23<br>0.23<br>0.23<br>0.23<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.30<br>0.36<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30  | 0.13 00<br>0.06 00<br>0.07 00<br>0.08 00<br>0.18 00<br>0.18 00<br>0.21 00<br>0.35 00<br>0.35 00<br>0.39 00<br>0.30 00<br>0.37 00<br>0.47 00<br>0.47 00<br>0.47 00<br>0.47 00<br>0.48 00<br>0.49 00<br>0.59 00<br>0.59 00<br>0.69 00<br>0.60 00<br>0.6 | 1.55<br>1.50<br>1.54<br>1.57<br>1.65<br>1.71<br>1.65<br>1.99<br>1.99<br>2.10<br>2.03<br>2.18<br>2.10<br>2.01<br>2.18<br>2.19<br>2.18<br>2.19<br>2.18<br>2.19<br>2.18<br>2.19<br>2.19<br>2.18<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19 | 22<br>24<br>17<br>17<br>16<br>3<br>21<br>8<br>-4<br>-19<br>-41<br>-53<br>-49<br>-61<br>-68<br>-16<br>24<br>90<br>137<br>75<br>17<br>17<br>17<br>17<br>17<br>17<br>17<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18<br>18 | 23.5<br>23.3<br>23.3<br>23.6<br>24.6<br>25.1<br>25.0<br>26.1<br>29.4<br>27.6<br>26.9<br>28.3<br>27.6<br>29.8<br>29.8<br>31.2<br>29.8<br>31.2<br>28.5<br>28.5<br>28.9                               | 18.0<br>17.8<br>17.7<br>17.9<br>18.2<br>18.5<br>18.9<br>20.3<br>18.9<br>17.7<br>17.3<br>18.0<br>18.2<br>20.4<br>21.3<br>22.5<br>22.1<br>23.6<br>22.1<br>23.6<br>22.1<br>23.6<br>22.1<br>23.3 |   | 834 7<br>832 7<br>834 7<br>834 7<br>835 7<br>839 7<br>835 7<br>842 7<br>842 7<br>842 7<br>842 7<br>842 7<br>842 8<br>857 8<br>867 8<br>867 8<br>867 8<br>868 8<br>888 8<br>891 8   |
|  | 31.3<br>31.3<br>31.3<br>32.8<br>33.8<br>33.6<br>35.1<br>37.3<br>35.8<br>36.2<br>37.1<br>39.2<br>42.0<br>42.0<br>42.0<br>42.0<br>38.9<br>38.9<br>38.7<br>38.7<br>39.6  | 23.7<br>23.6<br>23.8<br>24.2<br>24.4<br>24.6<br>25.2<br>27.3<br>23.5<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3<br>24.3   |  | 0.30<br>0.17<br>0.16<br>0.20<br>0.19<br>0.39<br>0.37<br>0.53<br>0.20<br>0.86<br>0.38<br>0.38<br>0.38<br>0.38<br>0.36<br>0.30<br>0.36<br>0.50<br>0.40<br>0.20<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40<br>0.40  | 0.27 00<br>0.08 00<br>0.18 00<br>0.14 00<br>0.14 00<br>0.21 00<br>0.35 00<br>0.35 00<br>0.39 00<br>0.39 00<br>0.39 00<br>0.47 00<br>0.47 00<br>0.47 00<br>0.47 00<br>0.47 00<br>0.47 00<br>0.48 00<br>0.49 00<br>0.59 00<br>0.59 00<br>0.69 00<br>0.60 00<br>0.6 | 1.54<br>1.54<br>1.57<br>1.64<br>1.72<br>1.71<br>1.65<br>1.81<br>2.13<br>2.03<br>2.01<br>2.03<br>2.03<br>2.01<br>2.08<br>2.19<br>2.09<br>2.18<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19   | 18<br>17<br>14<br>6<br>3<br>21<br>8<br>-4<br>-19<br>-41<br>-53<br>-41<br>-68<br>-16<br>24<br>90<br>137<br>75<br>175<br>175<br>175<br>175<br>175<br>175<br>175<br>175<br>175  | 23.3<br>23.6<br>24.4<br>25.0<br>26.1<br>29.4<br>26.6<br>27.6<br>26.9<br>27.6<br>29.8<br>29.8<br>29.8<br>30.4<br>29.8<br>31.2<br>28.5<br>28.5<br>28.9   | 17.8<br>17.7<br>18.2<br>18.3<br>18.5<br>18.9<br>20.3<br>17.7<br>17.3<br>18.0<br>18.2<br>20.4<br>21.3<br>223.6<br>225.2<br>22.1<br>221.3  |   | 834 7<br>834 7<br>835 7<br>835 7<br>839 7<br>834 7<br>842 7<br>842 7<br>842 7<br>844 7<br>850 8<br>857 8<br>861 8<br>867 8<br>888 8<br>888 8<br>888 8<br>891 8   |
|  | 31.3<br>31.7<br>32.8<br>33.6<br>33.0<br>35.3<br>37.3<br>35.8<br>37.3<br>39.0<br>40.2<br>41.0<br>42.0<br>42.0<br>42.0<br>38.4<br>38.9<br>38.2<br>38.2<br>38.2<br>38.3  | 23.6<br>23.8<br>24.2<br>24.4<br>24.2<br>25.3<br>25.3<br>23.5<br>24.3<br>24.3<br>24.9<br>27.3<br>31.5<br>31.5<br>31.5<br>31.5<br>29.6<br>27.3<br>29.6<br>27.3<br>29.6   |  | 0.17<br>0.24<br>0.20<br>0.19<br>0.47<br>2.39<br>0.35<br>0.72<br>0.23<br>0.88<br>0.31<br>0.64<br>0.50<br>0.23<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36  | 0.08 00<br>0.18 00<br>0.18 00<br>0.21 00<br>0.35 00<br>0.35 00<br>0.39 00<br>0.39 00<br>0.30 00<br>0.71 00<br>0.71 00<br>0.47 00<br>0.47 00<br>0.47 00<br>0.137 00<br>0.137 00<br>0.147 00<br>0.147 00<br>0.147 00<br>0.147 00<br>0.148 00<br>0.148 00<br>0.149 00   | 1.54<br>1.57<br>1.64<br>1.72<br>1.71<br>1.65<br>1.99<br>1.98<br>2.10<br>2.01<br>2.18<br>2.10<br>2.01<br>2.18<br>2.19<br>2.18<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19   | 17<br>17<br>14<br>6<br>3<br>21<br>8<br>-4<br>-19<br>-41<br>-53<br>-41<br>-68<br>-16<br>24<br>90<br>137<br>755<br>17<br>175<br>17<br>365  | 23.3<br>23.6<br>24.4<br>25.1<br>25.0<br>24.6<br>26.1<br>29.4<br>27.6<br>26.9<br>28.3<br>27.6<br>29.8<br>29.1<br>29.8<br>30.4<br>29.8<br>31.2<br>28.5<br>28.5<br>28.5<br>28.5                       | 17.7<br>17.9<br>18.2<br>18.3<br>18.5<br>18.5<br>20.3<br>18.9<br>20.3<br>18.0<br>18.2<br>20.4<br>21.3<br>23.6<br>225.2<br>22.1<br>23.3  |   | 834 7<br>835 7<br>839 7<br>839 7<br>835 7<br>834 7<br>842 7<br>842 7<br>850 8<br>857 8<br>861 8<br>867 8<br>888 8<br>888 8<br>888 8<br>888 8   |
|  | 31.7<br>32.8<br>33.6<br>33.0<br>35.16<br>37.3<br>35.2<br>37.2<br>37.2<br>39.1<br>40.2<br>39.1<br>42.0<br>42.0<br>42.0<br>38.4<br>38.9<br>38.9<br>38.2<br>39.6   | 23.8<br>24.2<br>24.2<br>24.6<br>25.2<br>27.3<br>23.5<br>24.3<br>24.0<br>24.3<br>24.2<br>26.9<br>27.5<br>31.5<br>31.7<br>29.6<br>27.3<br>29.6<br>27.3<br>27.3<br>29.6   |  | 0.24<br>0.16<br>0.19<br>0.47<br>0.35<br>0.72<br>0.53<br>0.86<br>0.38<br>0.31<br>0.64<br>0.50<br>0.23<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36  | 0.18 00<br>0.14 00<br>0.21 00<br>0.35 00<br>0.39 00<br>0.39 00<br>0.30 00<br>0.71 00<br>0.71 00<br>0.71 00<br>0.47 00<br>0.47 00<br>0.43 00<br>0.62 00<br>0.82 00<br>0.137 00<br>0.47 00<br>0.48 00<br>0.49 00<br>0.140 00<br>0.49 00<br>0.59 00<br>0.69 00<br>0.60 00<br>0 | 1.57<br>1.64<br>1.71<br>1.65<br>1.81<br>1.99<br>1.92<br>2.03<br>2.01<br>2.03<br>2.01<br>2.18<br>2.19<br>2.09<br>2.18<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19   | 17<br>14<br>6<br>3<br>21<br>8<br>-4<br>-19<br>-41<br>-53<br>-49<br>-61<br>-68<br>-16<br>24<br>90<br>81<br>137<br>75<br>17<br>365   | 23.6<br>24.4<br>25.0<br>24.6<br>1<br>29.4<br>27.7<br>26.9<br>28.3<br>27.6<br>29.0<br>29.1<br>29.8<br>30.4<br>29.8<br>31.2<br>28.5<br>28.5<br>28.9  | 17.9<br>18.2<br>18.3<br>18.5<br>18.9<br>20.3<br>18.9<br>17.7<br>18.3<br>18.2<br>20.4<br>21.3<br>22.4<br>22.3<br>22.3<br>22.3<br>22.3   |   | 834 7<br>835 7<br>839 7<br>835 7<br>834 7<br>842 7<br>842 7<br>844 7<br>850 8<br>861 8<br>867 8<br>878 8<br>888 8<br>888 8<br>888 8<br>888 8<br>891 8  |
|  | 32.8<br>33.8<br>33.0<br>35.1<br>37.3<br>35.8<br>36.2<br>37.1<br>39.2<br>40.2<br>42.0<br>42.0<br>42.0<br>38.9<br>38.0<br>38.7<br>38.7<br>39.6  | 24.2<br>24.4<br>24.6<br>25.2<br>27.1<br>25.3<br>24.3<br>24.0<br>24.3<br>24.2<br>26.9<br>27.2<br>28.5<br>31.7<br>29.0<br>27.3<br>27.3<br>27.3<br>29.0   |  | 0.16<br>0.29<br>0.47<br>2.39<br>0.372<br>0.53<br>0.20<br>0.86<br>0.38<br>0.31<br>0.64<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36<br>0.36   | 0.14 00<br>0.21 00<br>0.35 00<br>0.39 00<br>0.39 00<br>0.82 00<br>0.71 00<br>0.21 00<br>0.21 00<br>0.47 00<br>0.47 00<br>0.43 00<br>0.67 00<br>1.10 00<br>1.10 00<br>1.10 00<br>1.10 00<br>1.10 00<br>1.10 00<br>0.78 00<br>0.78 00<br>0.95 00<br>0.95 00<br>0.95 00<br>0.98 00<br>0.9 | 1.64<br>1.71<br>1.65<br>1.81<br>2.13<br>1.99<br>1.92<br>2.00<br>2.03<br>2.01<br>2.08<br>2.19<br>2.09<br>2.18<br>2.19<br>2.19<br>2.19<br>2.19<br>2.19   | 14<br>6<br>3<br>21<br>8<br>-19<br>-42<br>-61<br>-53<br>-41<br>-68<br>-16<br>6<br>24<br>90<br>137<br>75<br>17<br>39<br>65   | 24.4<br>25.1<br>24.6<br>26.1<br>29.7<br>26.6<br>27.7<br>26.6<br>27.6<br>29.8<br>29.8<br>29.1<br>29.8<br>30.4<br>31.2<br>28.5<br>28.5<br>28.9   | 18.2<br>18.3<br>18.5<br>18.9<br>20.3<br>17.7<br>17.3<br>18.0<br>18.2<br>20.4<br>21.3<br>223.6<br>225.2<br>22.1<br>20.3   |   | 839 7<br>835 7<br>834 7<br>844 7<br>842 7<br>844 7<br>850 8<br>857 8<br>861 8<br>867 8<br>888 8<br>888 8<br>888 8<br>891 8<br>892 8<br>888 8   |
|  | 33.6<br>33.0<br>35.1<br>39.6<br>37.3<br>35.8<br>38.1<br>37.2<br>37.1<br>40.2<br>39.0<br>42.0<br>42.0<br>42.0<br>38.4<br>38.9<br>38.7<br>38.7<br>38.7  | 24.2<br>24.6<br>25.3<br>27.1<br>25.3<br>23.5<br>24.3<br>24.0<br>24.2<br>26.9<br>27.3<br>31.5<br>31.7<br>29.6<br>27.3<br>27.3<br>27.3<br>29.8   |  | 0.19<br>0.47<br>0.35<br>0.72<br>0.23<br>0.86<br>0.38<br>0.31<br>0.64<br>0.50<br>0.48<br>0.48<br>0.48<br>0.23  | 0.35 00<br>0.39 00<br>0.39 00<br>0.30 00<br>0.82 00<br>0.71 00<br>0.37 00<br>0.21 00<br>0.69 00<br>0.43 00<br>0.67 00<br>1.10 00<br>0.78 00<br>0.78 00<br>0.78 00<br>0.95 00<br>0.95 00<br>0.95 00<br>0.95 00<br>0.95 00<br>0.95 00<br>0.96 00<br>0.97 00<br>0.98 00<br>0.9 | 1.71<br>1.61<br>2.13<br>1.99<br>1.92<br>2.10<br>2.01<br>2.18<br>2.19<br>2.09<br>2.18<br>2.19<br>2.18<br>2.19<br>2.18<br>2.19<br>2.19<br>2.18<br>2.19<br>2.19   | 3<br>21<br>8<br>-4<br>-19<br>-41<br>-53<br>-41<br>-68<br>-16<br>24<br>90<br>81<br>137<br>755<br>17<br>365  | 25.0<br>24.6<br>29.4<br>27.7<br>26.9<br>28.3<br>27.6<br>27.6<br>29.8<br>29.1<br>29.8<br>29.1<br>29.8<br>31.2<br>31.2<br>28.5<br>28.5<br>28.9   | 18.2<br>18.5<br>18.9<br>17.7<br>18.3<br>18.0<br>18.2<br>20.1<br>20.4<br>21.3<br>23.6<br>25.2<br>22.1<br>20.3   |   | 839 7<br>835 7<br>8342 7<br>842 7<br>842 7<br>843 8<br>850 8<br>857 8<br>861 8<br>861 8<br>883 8<br>884 8<br>888 8<br>891 8<br>892 8<br>888 8  |
|  | 33.0<br>35.1<br>37.3<br>35.8<br>36.2<br>37.1<br>37.2<br>39.1<br>40.2<br>39.1<br>42.0<br>42.0<br>38.9<br>38.9<br>38.7<br>38.7<br>38.7  | 24.6<br>25.2<br>27.1<br>23.5<br>23.5<br>24.3<br>24.0<br>24.3<br>24.2<br>26.9<br>27.2<br>28.5<br>31.7<br>33.9<br>29.0<br>27.3<br>29.0<br>27.3<br>29.8   |  | 0.47<br>2.39<br>0.72<br>0.53<br>0.23<br>0.86<br>0.38<br>0.31<br>0.64<br>0.50<br>0.36<br>0.23<br>0.40<br>0.23  | 0.39 00<br>0.30 00<br>0.82 00<br>0.71 00<br>0.21 00<br>0.47 00<br>0.43 00<br>0.43 00<br>0.47 00<br>0.43 00<br>0.47 00<br>0.48 00<br>0.137 00<br>0.137 00<br>0.148 00<br>0.149 00   | 1.65<br>1.81<br>1.99<br>1.92<br>1.92<br>2.03<br>2.01<br>2.18<br>2.19<br>2.08<br>2.18<br>2.19<br>2.18<br>2.19<br>2.18<br>2.19<br>2.18<br>2.19   | 21<br>84<br>-19<br>-42<br>-53<br>-49<br>-61<br>-68<br>-16<br>24<br>90<br>81<br>137<br>75<br>17<br>17<br>365  | 24.6<br>26.1<br>29.4<br>27.7<br>26.6<br>28.3<br>27.6<br>29.8<br>29.8<br>29.1<br>29.8<br>30.4<br>31.2<br>28.5<br>28.2<br>28.9   | 18.5<br>18.9<br>20.3<br>17.7<br>17.3<br>18.0<br>18.2<br>20.1<br>20.4<br>22.1<br>23.5<br>23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 835 7<br>834 7<br>842 7<br>842 7<br>844 7<br>850 8<br>851 8<br>861 8<br>867 8<br>878 8<br>888 8<br>888 8<br>888 8<br>891 8<br>892 8<br>888 8   |
|  | 35.1<br>37.3<br>35.8<br>36.2<br>38.1<br>37.1<br>39.2<br>39.1<br>40.2<br>42.0<br>42.0<br>38.0<br>38.0<br>38.7<br>38.7<br>38.7  | 25.2<br>27.1<br>25.3.5<br>23.0<br>24.0<br>24.3<br>24.3<br>24.2<br>26.9<br>27.2<br>28.5<br>31.7<br>33.9<br>29.6<br>27.3<br>29.0<br>27.3<br>29.8   |  | 2.39<br>0.372<br>0.53<br>0.20<br>0.86<br>0.38<br>0.38<br>0.31<br>0.64<br>0.50<br>0.30<br>0.30<br>0.40<br>0.20<br>0.20<br>0.20<br>0.20<br>0.30<br>0.30<br>0.30<br>0.3  | 1.39 00<br>0.30 00<br>0.82 00<br>0.71 00<br>0.71 00<br>0.21 00<br>0.69 00<br>0.47 00<br>0.43 00<br>0.10 00<br>1.10 00<br>1.37 00<br>0.78 00<br>0.82 00<br>0.82 00<br>0.82 00<br>0.95 00<br>0.95 00<br>0.95 00<br>0.95 00<br>0.95 00<br>0.95 00<br>0.96 00<br>0.97 00<br>0.97 00<br>0.98 00<br>0.9 | 1.81<br>2.13<br>1.99<br>1.92<br>1.98<br>2.10<br>2.03<br>2.01<br>2.18<br>2.19<br>2.10<br>2.10<br>2.10<br>1.93<br>1.99<br>2.02<br>2.10   | 8  | 26.1<br>29.4<br>27.7<br>26.6<br>26.9<br>28.3<br>27.6<br>29.0<br>29.8<br>29.1<br>30.4<br>31.2<br>28.5<br>28.5<br>28.9   | 18.9<br>20.3<br>18.9<br>17.7<br>17.3<br>18.3<br>18.2<br>20.1<br>20.4<br>22.3<br>23.5<br>23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 834 7<br>842 7<br>842 7<br>844 7<br>850 8<br>851 8<br>861 8<br>867 8<br>883 8<br>883 8<br>884 8<br>888 8<br>891 8<br>892 8<br>888 8<br>898 8   |
|  | 39.6<br>37.3<br>35.8<br>36.2<br>38.1<br>37.2<br>39.0<br>40.2<br>39.0<br>42.0<br>42.0<br>42.0<br>38.4<br>38.9<br>38.9<br>38.2<br>38.7<br>38.2  | 27.1<br>25.3<br>23.5<br>24.3<br>24.3<br>24.2<br>26.9<br>27.2<br>28.5<br>31.5<br>31.7<br>33.9<br>29.6<br>27.1<br>28.5<br>29.0<br>27.3<br>29.8   |  | 0.35<br>0.72<br>0.20<br>0.23<br>0.38<br>0.38<br>0.31<br>0.52<br>0.30<br>0.52<br>0.30<br>0.40<br>0.23<br>0.23<br>0.31  | 0.30 00<br>0.82 00<br>0.82 00<br>0.37 00<br>0.37 00<br>0.21 00<br>0.47 00<br>0.43 00<br>0.10 00<br>1.10 00<br>0.78 00<br>0.78 00<br>0.78 00<br>0.94 00<br>1.45 00<br>0.95 00<br>0.95 00<br>0.98 00<br>0.9 | 2.13<br>1.92<br>1.98<br>2.10<br>2.03<br>2.01<br>2.18<br>2.19<br>2.09<br>2.18<br>2.19<br>2.19<br>2.10<br>1.99<br>2.09<br>2.10   | -4<br>-19<br>-42<br>-53<br>-49<br>-41<br>-68<br>-16<br>6<br>24<br>90<br>137<br>755<br>17<br>39<br>65   | 29.4<br>27.7<br>26.6<br>28.3<br>27.6<br>29.0<br>29.8<br>30.4<br>31.2<br>28.5<br>28.2<br>28.9   | 20.3<br>18.9<br>17.7<br>17.3<br>18.3<br>18.0<br>18.2<br>20.4<br>21.3<br>23.5<br>23.6<br>25.2<br>20.3<br>21.3   |   | 842 7<br>842 7<br>844 7<br>850 8<br>857 8<br>867 8<br>867 8<br>888 8<br>888 8<br>888 8<br>891 8<br>892 8<br>888 8  |
|  | 35.8<br>36.2<br>37.1<br>37.1<br>39.0<br>40.2<br>39.1<br>41.0<br>42.0<br>38.9<br>38.0<br>38.9<br>38.7<br>38.7<br>38.7  | 23.5<br>23.0<br>24.3<br>24.2<br>26.9<br>27.2<br>28.5<br>31.5<br>31.7<br>29.6<br>27.1<br>28.5<br>29.0<br>28.0<br>27.3<br>27.3<br>27.5   |  | 0.53<br>0.23<br>0.86<br>0.38<br>0.38<br>0.31<br>0.64<br>0.52<br>0.30<br>0.36<br>0.97<br>0.64<br>0.50<br>0.23<br>0.48  | 0.71 00<br>0.37 00<br>0.21 00<br>0.69 00<br>0.47 00<br>0.43 00<br>0.67 00<br>1.10 00<br>1.37 00<br>0.78 00<br>0.78 00<br>0.95 00<br>0.95 00<br>0.98 00<br>0.9 | 1.92<br>1.98<br>2.10<br>2.03<br>2.01<br>2.18<br>2.19<br>2.13<br>2.09<br>2.13<br>2.09<br>2.10<br>1.93<br>1.99<br>2.02   | -42<br>-61<br>-53<br>-49<br>-41<br>-68<br>-16<br>24<br>90<br>81<br>137<br>75<br>17<br>39<br>65   | 26.6<br>26.9<br>28.3<br>27.6<br>27.6<br>29.0<br>29.8<br>29.1<br>29.8<br>30.4<br>31.2<br>31.2<br>28.5<br>28.9   | 17.7<br>17.3<br>18.3<br>18.0<br>18.2<br>20.1<br>20.4<br>21.3<br>23.5<br>23.5<br>25.2<br>22.1<br>20.3<br>21.3   |   | 844 7<br>850 8<br>857 8<br>861 8<br>867 8<br>878 8<br>883 8<br>884 8<br>888 8<br>891 8<br>892 8<br>888 8<br>898 8  |
|  | 36.2<br>38.1<br>37.1<br>39.0<br>40.2<br>39.1<br>40.2<br>41.0<br>42.0<br>42.0<br>38.4<br>38.9<br>38.9<br>38.2<br>38.7<br>38.2  | 23.0<br>24.3<br>24.2<br>26.9<br>27.2<br>28.5<br>31.5<br>31.7<br>29.6<br>27.1<br>28.0<br>27.3<br>27.3<br>27.3<br>27.3   |  | 0.20<br>0.23<br>0.38<br>0.38<br>0.31<br>0.64<br>0.52<br>0.30<br>0.30<br>0.40<br>0.23<br>0.40  | 0.37 00<br>0.21 00<br>0.69 00<br>0.47 00<br>0.43 00<br>0.67 00<br>1.10 00<br>0.78 00<br>0.78 00<br>0.82 00<br>1.94 00<br>0.95 00<br>0.39 00<br>0.39 00<br>0.62 00<br>0.78 00<br>0.62 00<br>0.63 00   | 1.98<br>2.10<br>2.03<br>2.01<br>2.18<br>2.19<br>2.08<br>2.13<br>2.09<br>2.18<br>2.10<br>1.93<br>1.99<br>2.02<br>1.92   | -61<br>-53<br>-49<br>-41<br>-68<br>-16<br>6<br>24<br>90<br>81<br>137<br>75<br>17<br>39<br>65   | 26.9<br>28.3<br>27.6<br>27.6<br>29.0<br>29.8<br>29.1<br>29.8<br>30.4<br>31.2<br>28.5<br>28.2<br>28.9   | 17.3<br>18.3<br>18.0<br>18.2<br>18.2<br>20.1<br>20.4<br>21.3<br>23.5<br>23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 850 8<br>857 8<br>861 8<br>867 8<br>878 8<br>883 8<br>884 8<br>888 8<br>891 8<br>892 8<br>888 8<br>888 8   |
|  | 38.1<br>37.2<br>37.1<br>39.0<br>40.2<br>39.1<br>41.0<br>42.0<br>42.0<br>38.4<br>38.9<br>38.9<br>38.2<br>38.7<br>38.2  | 24.3<br>24.0<br>24.3<br>26.9<br>27.2<br>28.5<br>31.5<br>33.9<br>29.6<br>27.1<br>28.0<br>27.3<br>27.3<br>27.8   |  | 0.23<br>0.86<br>0.38<br>0.31<br>0.64<br>0.52<br>0.36<br>0.97<br>0.64<br>0.50<br>0.40<br>0.29<br>0.40  | 0.21 00<br>0.69 00<br>0.47 00<br>0.43 00<br>0.67 00<br>1.10 00<br>1.10 00<br>0.78 00<br>0.82 00<br>1.94 00<br>0.95 00<br>0.39 00<br>0.38 00<br>0.78 00<br>0.08 00<br>0.08 00<br>0.08 00<br>0.08 00<br>0.08 00  | 2.10<br>2.03<br>2.01<br>2.18<br>2.19<br>2.08<br>2.13<br>2.09<br>2.18<br>2.10<br>1.93<br>1.99<br>2.02<br>1.92   | -53<br>-49<br>-41<br>-68<br>-16<br>6<br>24<br>90<br>81<br>137<br>75<br>17<br>39<br>65  | 28.3<br>27.6<br>27.6<br>29.0<br>29.8<br>29.1<br>29.8<br>30.4<br>31.2<br>28.5<br>28.2<br>28.9   | 18.3<br>18.0<br>18.2<br>18.2<br>20.1<br>20.4<br>21.3<br>23.5<br>23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 857 861 861 861 861 861 861 883 883 884 888 8891 8992 8888 8898 8990 8888 8890 8   |
|  | 37.2<br>37.1<br>39.0<br>40.2<br>41.0<br>42.0<br>38.4<br>38.0<br>38.9<br>38.2<br>38.7<br>38.2  | 24.0<br>24.3<br>24.2<br>26.9<br>27.2<br>28.5<br>31.5<br>31.7<br>33.9<br>29.0<br>27.1<br>28.5<br>29.0<br>27.3<br>27.5<br>29.8   |  | 0.86<br>0.38<br>0.31<br>0.52<br>0.30<br>0.52<br>0.30<br>0.97<br>0.64<br>0.50<br>0.20<br>0.48<br>0.40<br>0.23<br>0.46  | 0.69 00<br>0.47 00<br>0.43 00<br>0.67 00<br>1.10 00<br>1.37 00<br>0.78 00<br>0.82 00<br>1.94 00<br>1.94 00<br>0.95 00<br>0.39 00<br>0.88 00<br>0.62 00<br>0.62 00<br>0.62 00   | 2.03<br>2.01<br>2.18<br>2.19<br>2.19<br>2.13<br>2.09<br>2.18<br>2.10<br>1.93<br>1.99<br>2.92<br>1.98   | -49<br>-41<br>-68<br>-16<br>6<br>24<br>90<br>81<br>137<br>75<br>17<br>39<br>65   | 27.6<br>27.6<br>29.0<br>29.8<br>29.1<br>29.8<br>30.4<br>31.2<br>28.5<br>28.2<br>28.9   | 18.0<br>18.2<br>18.2<br>20.1<br>20.4<br>21.3<br>23.5<br>23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 861 8<br>867 8<br>878 8<br>883 8<br>884 8<br>888 8<br>891 8<br>892 8<br>888 8<br>888 8   |
|  | 39.0<br>40.2<br>39.1<br>41.0<br>42.0<br>42.0<br>38.4<br>38.9<br>38.2<br>38.7<br>38.2  | 24.2<br>26.9<br>27.2<br>28.5<br>31.5<br>31.7<br>33.9<br>29.6<br>27.1<br>28.5<br>29.0<br>28.0<br>27.5<br>29.8   |  | 0.38<br>0.31<br>0.64<br>0.52<br>0.30<br>0.97<br>0.64<br>0.50<br>0.48<br>0.40<br>0.29<br>0.46  | 0.43 00<br>0.67 00<br>1.10 00<br>1.37 00<br>0.78 00<br>0.82 00<br>1.94 00<br>1.45 00<br>0.95 00<br>0.39 00<br>0.88 00<br>0.78 00<br>0.78 00<br>0.78 00<br>0.78 00  | 2.18<br>2.19<br>2.08<br>2.13<br>2.09<br>2.18<br>2.10<br>1.93<br>1.99<br>2.02<br>1.92   | -68<br>-16<br>6<br>24<br>90<br>81<br>137<br>75<br>17<br>39<br>65   | 29.0<br>29.8<br>29.1<br>29.8<br>30.4<br>31.2<br>31.2<br>28.5<br>28.2<br>28.9   | 18.2<br>20.1<br>20.4<br>21.3<br>23.5<br>23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 878 8<br>883 8<br>884 8<br>888 8<br>891 8<br>892 8<br>888 8<br>888 8   |
|  | 40.2<br>39.1<br>40.2<br>41.0<br>42.0<br>38.4<br>38.0<br>38.9<br>38.2<br>38.2<br>38.2  | 26.9<br>27.2<br>28.5<br>31.5<br>31.7<br>33.9<br>29.6<br>27.1<br>28.5<br>29.0<br>28.0<br>27.3<br>27.5<br>29.8   |  | 0.31<br>0.64<br>0.52<br>0.30<br>0.36<br>0.97<br>0.64<br>0.50<br>0.40<br>0.40<br>0.23<br>0.29<br>0.46  | 0.67 00<br>1.10 00<br>1.37 00<br>0.78 00<br>0.82 00<br>1.94 00<br>1.45 00<br>0.95 00<br>0.39 00<br>0.38 00<br>0.78 00<br>0.78 00   | 2.19<br>2.08<br>2.13<br>2.09<br>2.18<br>2.10<br>1.93<br>1.99<br>2.02<br>1.92<br>1.98   | -16<br>6<br>24<br>90<br>81<br>137<br>75<br>17<br>39<br>65  | 29.8<br>29.1<br>29.8<br>30.4<br>31.2<br>31.2<br>28.5<br>28.2<br>28.9   | 20.1<br>20.4<br>21.3<br>23.5<br>23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 883 8<br>884 8<br>888 8<br>891 8<br>892 8<br>888 8<br>888 8  |
|  | 39.1<br>40.2<br>41.0<br>42.0<br>42.0<br>38.4<br>38.0<br>38.9<br>38.2<br>38.2<br>38.2  | 27.2<br>28.5<br>31.5<br>31.7<br>33.9<br>29.6<br>27.1<br>28.5<br>29.0<br>27.3<br>27.5<br>29.8   |  | 0.64<br>0.52<br>0.30<br>0.36<br>0.97<br>0.64<br>0.50<br>0.20<br>0.48<br>0.40<br>0.29<br>0.46  | 1.10 00<br>1.37 00<br>0.78 00<br>0.82 00<br>1.94 00<br>1.45 00<br>0.95 00<br>0.39 00<br>0.88 00<br>0.78 00<br>0.78 00  | 2.08<br>2.13<br>2.09<br>2.18<br>2.10<br>1.93<br>1.99<br>2.02<br>1.92<br>1.98   | 6<br>24<br>90<br>81<br>137<br>75<br>17<br>39<br>65   | 29.1<br>29.8<br>30.4<br>31.2<br>31.2<br>28.5<br>28.2<br>28.9   | 20.4<br>21.3<br>23.5<br>23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 884 8<br>888 8<br>891 8<br>892 8<br>888 8<br>888 8   |
|  | 41.0<br>42.0<br>42.0<br>38.4<br>38.0<br>38.9<br>38.0<br>38.2<br>38.7<br>38.2<br>39.6  | 31.5<br>31.7<br>33.9<br>29.6<br>27.1<br>28.5<br>29.0<br>28.0<br>27.3<br>27.5<br>29.8   |  | 0.30<br>0.36<br>0.97<br>0.64<br>0.50<br>0.20<br>0.48<br>0.40<br>0.23<br>0.29<br>0.46  | 0.78 00<br>0.82 00<br>1.94 00<br>1.45 00<br>0.95 00<br>0.39 00<br>0.88 00<br>0.78 00<br>0.62 00<br>0.53 00   | 2.09<br>2.18<br>2.10<br>1.93<br>1.99<br>2.02<br>1.92<br>1.98   | 90<br>81<br>137<br>75<br>17<br>39<br>65  | 30.4<br>31.2<br>31.2<br>28.5<br>28.2<br>28.9   | 23.5<br>23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 888 8<br>891 8<br>892 8<br>888 8<br>888 8  |
|  | 42.0<br>42.0<br>38.4<br>38.0<br>38.9<br>38.0<br>38.2<br>38.7<br>38.2<br>39.6  | 31.7<br>33.9<br>29.6<br>27.1<br>28.5<br>29.0<br>28.0<br>27.3<br>27.5<br>29.8   |  | 0.36<br>0.97<br>0.64<br>0.50<br>0.20<br>0.48<br>0.40<br>0.23<br>0.29  | 0.82 00<br>1.94 00<br>1.45 00<br>0.95 00<br>0.39 00<br>0.88 00<br>0.78 00<br>0.62 00<br>0.53 00  | 2.18<br>2.10<br>1.93<br>1.99<br>2.02<br>1.92<br>1.98   | 81<br>137<br>75<br>17<br>39<br>65  | 31.2<br>31.2<br>28.5<br>28.2<br>28.9   | 23.6<br>25.2<br>22.1<br>20.3<br>21.3   |   | 891 8<br>892 8<br>888 8<br>888 8<br>890 8  |
|  | 42.0<br>38.4<br>38.0<br>38.9<br>38.0<br>38.2<br>38.7<br>38.2<br>39.6  | 33.9<br>29.6<br>27.1<br>28.5<br>29.0<br>28.0<br>27.3<br>27.5<br>29.8   |  | 0.97<br>0.64<br>0.50<br>0.20<br>0.48<br>0.40<br>0.23<br>0.29<br>0.46  | 1.94 00<br>1.45 00<br>0.95 00<br>0.39 00<br>0.88 00<br>0.78 00<br>0.62 00<br>0.53 00   | 2.10<br>1.93<br>1.99<br>2.02<br>1.92<br>1.98   | 137<br>75<br>17<br>39<br>65  | 31.2<br>28.5<br>28.2<br>28.9   | 25.2<br>22.1<br>20.3<br>21.3   |   | 892 8<br>888 8<br>888 8<br>890 8   |
|  | 38.4<br>38.0<br>38.9<br>38.0<br>38.2<br>38.7<br>38.2<br>39.6  | 29.6<br>27.1<br>28.5<br>29.0<br>28.0<br>27.3<br>27.5<br>29.8   |  | 0.64<br>0.50<br>0.20<br>0.48<br>0.40<br>0.23<br>0.29<br>0.46  | 1.45 00<br>0.95 00<br>0.39 00<br>0.88 00<br>0.78 00<br>0.62 00<br>0.53 00  | 1.93<br>1.99<br>2.02<br>1.92<br>1.98   | 75<br>17<br>39<br>65   | 28.5<br>28.2<br>28.9   | 22.1<br>20.3<br>21.3   |   | 888 8<br>888 8<br>890 8  |
|  | 38.9<br>38.0<br>38.2<br>38.7<br>38.2<br>39.6  | 28.5<br>29.0<br>28.0<br>27.3<br>27.5<br>29.8   |  | 0.50<br>0.20<br>0.48<br>0.40<br>0.23<br>0.29<br>0.46  | 0.95 00<br>0.39 00<br>0.88 00<br>0.78 00<br>0.62 00<br>0.53 00   | 1.99<br>2.02<br>1.92<br>1.98   | 39<br>65   | 28.9   | 21.3   |   | 890 8  |
|  | 38.0<br>38.2<br>38.7<br>38.2<br>39.6  | 29.0<br>28.0<br>27.3<br>27.5<br>29.8   |  | 0.48<br>0.40<br>0.23<br>0.29<br>0.46  | 0.88 00<br>0.78 00<br>0.62 00<br>0.53 00   | 1.92<br>1.98   | 65   |  |  |   |  |
|  | 38.2<br>38.7<br>38.2<br>39.6  | 28.0<br>27.3<br>27.5<br>29.8   |  | 0.40<br>0.23<br>0.29<br>0.46  | 0.78 00<br>0.62 00<br>0.53 00  | 1.98   |  | 20.2   | 21.0   |   | 001 0  |
|  | 38.7<br>38.2<br>39.6  | 27.3<br>27.5<br>29.8   |  | 0.23<br>0.29<br>0.46  | 0.62 00<br>0.53 00   |  | 37   | 28.4   | 20.9   |   | 888 8  |
|  | 39.6  | 29.8   |  | 0.46  | 0.53 00  | 2.04   | 13   |  | 20.4   |   | 893 8  |
|  |   |  |  |   |  | 1.99   |  |  | 20.5   |   | 888 8  |
|  |   |  |  |   |  |  |  |  | 22.2<br>19.6   |   | 890 8<br>888 8   |
|  | 38.0  |  |  |   |  |  |  |  | 20.3   |   | 890 8  |
|  | 40.4  |  |  | 0.73  | 1.59 00  | 1.95   |  |  | 25.1   |   | 887 8  |
| •      | 40.3<br>39.2  |  |  |   |  |  |  | 30.0<br>29.1   | 23.8<br>21.8   |   | 888 8<br>887 8   |
|  | 40.1  |  |  |   |  |  |  |  | 24.7   |   | 883 8  |
|  | 43.3  |  |  | 1.24  | 2.95 00  | 2.01   |  |  | 29.1   |   | 885 8  |
| • • • • • • • • •                            | 42.3  |  | • • • • • • • •                              |   |  |  |  |  | 28.8   |   | 885 8  |
|  | 40.6<br>39.7  |  |  |   |  |  |  |  | 26.1<br>25.1   |   | 887 8<br>887 8   |
|  | 40.8  |  |  |   |  |  |  |  | 25.6   |   | 890 8  |
|  | 40.8  | 35.3   |  | 1.00  | 2.02 00  | 1.94   | 188  | 30.3   | 26.2   |   | 888 8  |
|  | 39.6<br>41.0  |  |  |   |  |  |  |  | 24.7<br>25.9   |   | 888 8<br>891 8   |
|  | 38.4  |  |  | 0.43  | 0.72 00  | 1.84   |  |  | 23.9   |   | 887 8  |
|  | 39.4  | 34.1   |  | 0.50  | 1.01 00  | 1.85   | 177  | 29.2   | 25.4   |   | 888 8  |
| •      |   | 35.3   | •      |   |  |  |  | 30.1   | 26.3   |   | 892 8  |
|  | 39.3<br>38.0  |  |  |   |  |  | 181<br>159   |  | 25.4<br>24.4   |   | 890 8<br>888 8   |
|  | 37.7  | 31.1   |  | 0.98  | 1.91 00  | 1.82   | 123  | 28.0   | 23.2   |   | 890 8  |
| •      | 38.7  | 33.4   |  |   |  |  | 167  | 28.8   | 24.8   |   | 890 8  |
|  |   |  |  |   |  |  |  | 29. I<br>27. g   | 20.5   |   | 890 8<br>885 8   |
|  |   |  |  |   |  |  | 154  | 28.3   | 24.2   |   | 888 8  |
|  |   |  |  | 0.17  | 0.34 00  | 1.83   | 130  | 28.2   | 23.5   |   | 891 8  |
|  | 38.1<br>38.0  |  |  | 0.67  | 1 45 AA  |  | 1/12   | 27.9   | 23.7   |   | 888 8  |
|  | 38.1<br>38.0<br>37.6  | 31.8   |  |   |  |  | 142  | 27 2   | 22 2   |   |  |
|  | 38.1<br>38.0<br>37.6<br>36.6  | 31.8<br>31.3   |  | 0.82  | 1.70 00  | 1.72   | 142  | 27.2<br>27.4   | 23.3   |   | 885 8<br>888 8   |
|  | 38.1<br>38.0<br>37.6  | 31.8<br>31.3<br>29.8   |  | 0.82<br>0.30  | 1.70 00<br>0.56 00   | 1.72<br>1.80   | 142<br>99  | 27.2<br>27.4<br>28.1   | 22.2   |   | 888 8<br>887 8   |
|  |   |  |  | 39.2 34.3<br>37.4 33.1<br>38.1 32.5<br>38.0 31.6  |  |  |  |  |  |   |  |

Fig. 2. Sample output from a computer program that reduces raw data

```
18-MONTH UNCORRECTED (WET) 31-GHz BRIGHTNESS TEMPERATURE HISTOGRAM
                              > 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 
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18
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51
62
119
112
139
161
148
212
           138
134
130
122
118
110
106
102
98
94
110
98
82
87
87
49
40
43
                     139
1315
127
123
119
115
1110
103
99
95
91
83
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32
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82
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410
414
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747
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1988
2941
1696
1810
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                                         2210
2508
2311
2221
2047
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                                                             *************
                                          1541
732
                                                             · **********************************
                                                            ***********
                                                            *****
                                              183
159
                                 <10
                                                            ****
TOTAL # = 29430
NOTE: Above temperatures include 3°K cosmic background
```

Fig. 3. Histogram of zenith-normalized 31-GHz brightness temperature for an 18-month period. Data are not corrected for water-on-radome effects.

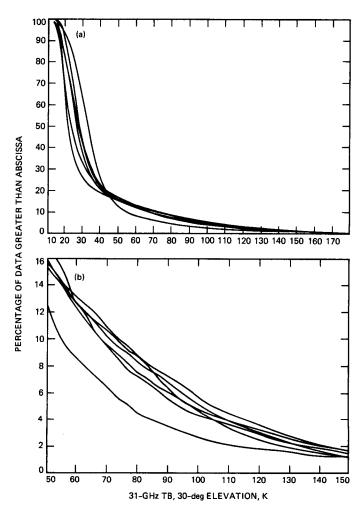


Fig. 4. Exceedance plots for 3-month groupings of 18 months' worth of 31-GHz zenith-normalized sky brightness temperature. Data are not corrected for water-on-radome effects.

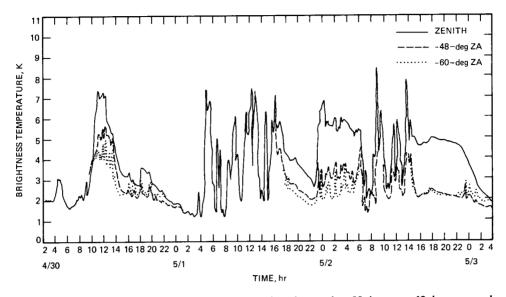


Fig. 5. Antenna temperature versus time for the elevation angles -60 degrees, -48 degrees, and zenith. The off-zenith data are normalized to zenith and are approximately the same when the radome is dry. Differences between these traces exist when water is on the radome.

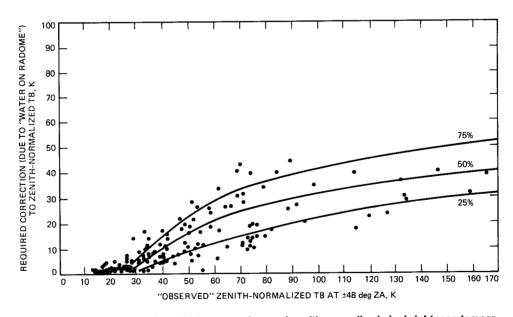


Fig. 6. An empirical relationship between observed zenith-normalized sky brightness temperature (X-coordinate) and the component of zenith-normalized sky brightness temperature that is due to water on the radome (Y-coordinate). Lines are hand-fit percentile estimators.

```
18-MONTH CORRECTED (DRY RADOME) 31-GHz BRIGHTNESS TEMPERATURE HISTOGRAM
         138
134
126
122
118
110
106
102
98
94
90
86
87
78
74
70
66
62
55
55
49
46
43
40
    133
129
125
121
117
113
109
105
101
97
93
89
85
81
77
73
65
61
            **
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             *****
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********
             **********
         675
917
1240
             .
**************
             -
******************
         1988
             ***************
             2941
1696
1810
2210
2508
2311
2221
2047
1541
732
183
             ************
             *************************
             ***************
             -
• ***********************
             *********
            *****
            ****
TOTAL # = 28299
NOTE: Above temperatures include 3°K cosmic background
```

Fig. 7. Histogram of wet-radome-corrected zenith sky brightness temperature for an 18-month period

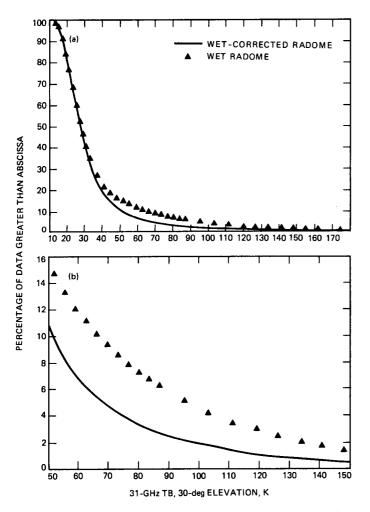


Fig. 8. The 31-GHz exceedance plots for 30-degree elevation for wet-radome data (A) and wet-radome-corrected data (lines)

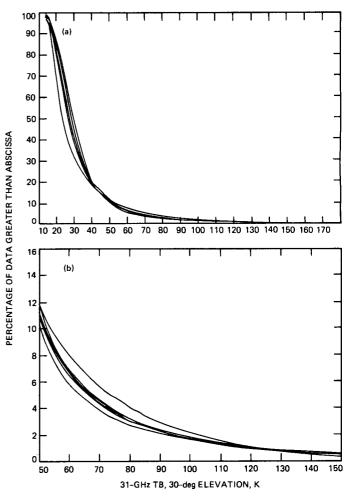


Fig. 9. The 31-GHz exceedance plots for 30-degree elevation for wet-radome-corrected-only data, grouped by season

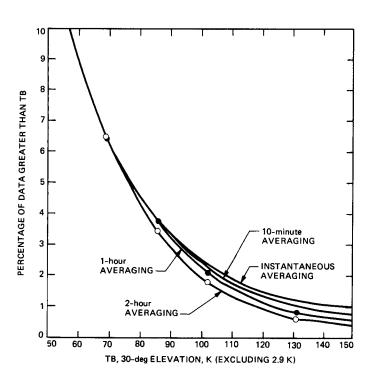


Fig. 10. Spain exceedance statistics [2]. Wet radome effects have been removed. Data are for a 4-month period in 1984 and are based on measurements from DSS 63.

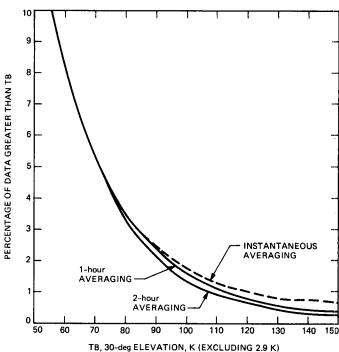


Fig. 11. Spain exceedance statistics with an adjustment made to correct for the larger-than-typical rainfall that occurred during the 4-month observing period in Spain (based on SCAMS WVR measurements)

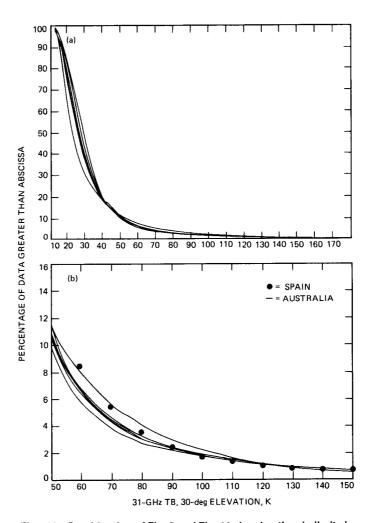


Fig. 12. Combination of Fig. 9 and Fig. 11 showing the similarity in exceedance plots for Spain and Australia